Agdex 440-20

Swine Management

Manitoba Agriculture

MG 12715

85-5066/

Contents

Introduction

Boar management 1

Selecting a herd size 1
Transporting the newly purchased boar 1
Handling the newly purchased boar 2
Housing and environment 3
Nutrition 3
Other management practises 3

Sow and gilt management 3

Raising and selecting replacement gilts 3
Pre-service management of replacement gilts 5
Management of newly purchased gilts 6
Management at breeding time 6
Management during gestation 8
Light effect 10
Temperature effect 10

Management of the sow and litter 10

Farrowing systems 10
Pre-farrowing 11
Farrowing 11
Baby pig management 15
Feeding the sow during lactation 17
Lactation length 18
Weaning 18

Reproductive efficiency of herd 19

Records of reproductive performance 19
Standards 19
Culling of breeding stock 19
Evaluating a sow feeding program 20

Post-weaning management 20

Management of home raised feeder pigs 20

Management of newly purchased feeder pigs 24

Summary 25

Swine management principles

Introduction

This publication focuses on pig husbandry and the day to day work activities that are necessary for a productive and profitable swine operation.

Boar management

The boar is the most important animal in a pig enterprise because one boat will generally produce 15 to 20 times as many offspring per year as a breeding female in the herd. Proper care and management of herd sires is essential for efficient pork production. For best results, boars must possess the genetic potential to sire efficient, fast-growing pigs which yield quality carcasses. They also must be kept healthy and in good body condition, regulated for services, fed a balanced diet and provided with good living conditions.

Selecting a herd sire

Herd sire selection is a difficult, but important decision. A boar's characteristics, good or bad, which are inherited by his offspring can be seen in the herd for several years. Besides outstanding performance records, boars must be physically strong and capable of servicing females for several years.

Breed choice Select a breed(s) of boar that fits with your herd breeding program. For a commercial producer, consider the following when selecting breeds for a crossbreeding program:

- Choose a breed that is competitive with other breeds in feed conversion and carcass traits, since these show little or no hybrid vigor from crossbreeding.
- Choose a breed that is readily available to allow selection of high performing boars when needed.
- Choose the breed according to its use in the crossbreeding system. Select terminal sire breeds on the basis of rate and efficiency of gain and carcass merit. If the breed of sire is being used as a parent of crossbred gilts or in a rotational crossing system, maternal and reproductive performance becomes important.

Boar performance Improvement in growth rate, feed conversion and carcass quality is obtained by sound herd boar selection. Purchase a boar from a reputable breeder who is on a performance testing program or choose from boars that have been tested at a boar test station. A boar with a composite performance score (index) considerably better than his contemporary group or herd average is recommended. If your herd requires improvement in a specific area, such as carcass index, give special attention to low backfat boars without sacrificing the performance levels of the other traits.

Superior performing boars should have an adjusted age to 90 kg (198 lbs) of 150 days or less and an adjusted backfat level of 12 mm (0.47 in) or less. High indexing boars tested at a central test station should have an average daily gain of at least 0.90 kg (2 lbs) per day, an adjusted backfat level of 12 mm (0.47 in) or less, and a feed efficiency of 2.3 units or less of feed per unit of gain.

Physical soundness The genetic potential of a boar will not be transmitted without the ability to breed and settle females. Boars need to be strong, sexually aggressive, with sound feet and legs. When purchasing boars check their underlines to make certain there are at least 12 evenly spaced teats, and at least two pair in front of the sheath. None of the teats should be inverted. Check testicles and sheath to make sure they are normal and functional. Do not buy boars with hernias, only one visible testicle or testicles that are undersized or oversized (swollen).

Health Buy only boars that are free of communicable diseases. Choose boars from herds of known health status and purchase stock from sources which are immunilogically compatible with your herd.

Plan ahead Purchase new boars two months before expected use. This also allows sufficient time to check their health, condition them to your farm and evaluate their breeding ability.

Transporting the newly purchased boar

Proper transporting of boars minimizes stress, injury and disease which may affect subsequent boar performance in the breeding herd. Follow these recommendations when transporting all breeding herd replacements:

- Use safe, well-built loading and unloading facilities that are free of sharp objects, well-bedded and not at a steep angle.
- Use a divider in the truck when hauling strange boars to prevent injury caused by fighting.

- Clean and disinfect the truck before transporting the boars.
- Provide suitable bedding (sand in summer, straw in winter) and protection against wind, extreme cold, rain, snow or heat. During hot weather, transport boars in a well-ventilated truck using moist bedding.
- Avoid hauling boars that have been fed heavily just before loading, especially in hot weather.

Handling the newly purchased boar

Proper management of a new boar during his first two months on the farm greatly improves his chances of becoming a useful, aggressive breeder.

Quarantine Isolate new boars for 30 days after arrival in clean and disinfected facilities that are located several hundred feet from the rest of the herd. Provide protection from extreme weather, a draft-free, ventilated sleeping area and an exercise area.

Blood test During the quarantine period, have a veterinarian make a visual inspection and take a blood sample to test for the boar's previous exposure to disease organisms.

Vaccination After the blood test, vaccinate the boar against erysipelas and leptospirosis, if this has not already been done.

Parasite treatment At the same time, use a broad spectrum anthelmintic for treatment against worms. Also, treat for mange.

Introducing new herd mates After the 30 day quarantine period, introduce several market animals or place some of the swine herd's manure in his pen. This enables the boar to development some immunity to new strains of micro-organisms which may be present in the new environment.

Test mate Test mating provides an opportunity to closely observe the boar's sexual behavior and his ability to serve normally. Avoid using boars before seven months of age, and only after the isolation period. Use young, docile cull sows or market gilts that are in good standing heat. These test mating procedures are recommended:

- Always take the female to the boar pen. Never put a new boar with a group of females.
- Pay particular attention to the boar's first service. If necessary assist the boar so he mounts correctly (on the right end to avoid injury) and enters the vagina correctly. Watch carefully for anal services or for limp, infantile (small) or tied (unable to extend) penis. If the first service is satisfactory, the boar will likely perform well.
- Observe the mated female, 18 to 22 days later to determine pregnancy. For best accuracy, breed more than one female.

A veterinary evaluation of the semen to determine its quality, that is, sperm motility, concentration, morphology and semen volume may be helpful.

About one in twelve young untried boars have some form of reproductive deficiency, resulting in a sterile or sub-fertile condition. A listing of common factors influencing boar fertility and the structure, function and possible malfunction of a boar's reproductive system are given in the Manitoba Agriculture factsheet *Fertility Check For New Boars*, Agdex 440-21.

There is no guaranteed laboratory test for fertility, although by test-mating and semen evaluation, a sterile boar or one of questionable fertility is often detected. Likewise, if a boar expresses high libido (sex drive), has good semen quality based on examination and has a normal looking reproductive system, he generally will have good reproductive capacity.

Fence contact Once you are satisfied that the boar meets health and breeding standards, let the boar have fence contact with a group of open gilts. This allows the boar and females to develop a stronger immunity against the organisms each might be carrying.

Housing and environment

Keep boars in comfortable individual pens or stalls that are draft-free and dry. Using individual pens or stalls eliminates fighting, riding, competition for feed and generally extends the life of the boar. Install adequate penning and gates to prevent boars from jumping over partitions and injurying themselves.

If the boar pen doubles as the service area, allow between 5 and 7 m^2 (54 and 75 ft^2) of floor area. Operations using 0.61 m x 2.1 m (2.0 ft x 6.9 ft) stalls to house boars report no more problems from the lack of exercise than enterprises using large boar pens or outside runs.

Keep boars cool and comfortable during the hot summer months. If boars are exposed to an ambient air temperature above 32°C (90°F) for over eight hours, it may reduce semen quality and produce up to four to six weeks of lowered fertility. This results in a lower conception rate and/or smaller litter size. For breeding in confinement during prolonged hot periods, a cooling system is recommended.

Nutrition

Feed boars between 2.3 to 3.0 kg (5.1 to 6.6 lbs) of 13 to 14 per cent dry sow ration per day. The exact level will depend on breeding load, condition of the boar and climatic conditions. Do not allow a boar to get fat. Provide fresh water at all times. In a hand mating system, do not feed boars shortly before they are scheduled for breeding.

Other management practices

Breeding frequency Boars should be at least seven months old before using them in the breeding herd. As a boar becomes older, there is an increase in his semen volume and total sperm production. Age is more important than size. Although a young boar may be physically large and willing to service sows, this does not mean he is sexually mature.

After a successful first service, use a young boar sparingly (one service weekly) until at least eight months of age. Frequency of service can be increased, according to levels in Table 1. If a boar is used several days in succession or twice daily, allow a 24 hour rest period.

Mating system It is better to bring females that are in heat to the boar (hand-mating) instead of running the boars with the females. This system takes more work and attention, but permits recording of actual breeding dates, simplifies the checking of returns to heat and insures that each sow is mated twice, 12 to 14 hours apart. (Double mating per estrus increases conception rate by 10 per cent and litter size by one pig). Also, problems with conception are identified sooner and turn-around time is saved on the sow herd.

Hand-mating enables the breeding of more females per boar. As well, the boar does not take the continuous physical abuse from other animals which occurs in a pen or group breeding system.

NOTE: For producers considering pen mating, see recommendations under mating systems in the "Sow and Gilt Management" section.

Breeding area Provide a separate breeding pen that has a floor with a sure footing. A wet, slippery floor makes it difficult for a boar to serve properly or for the female to stand firmly to be served. Boars can become frustrated and reluctant to serve. In addition, a severe slip can injure a boar, preventing breeding for a long time.

Sow and gilt management

Females also must be managed properly to achieve top performance and reproductive efficiency. A breeding female in a pig enterprise is meant to be pregnant, nursing a litter or getting bred. An "empty" period between these functions is unproductive and costly, drastically reducing efficiency.

Sows have great capability. Under good management, a sow can produce 2.2 litters per year, or over 20 pigs annually. Good nutrition, proper environment and high health standards, as well as recording all herd activities, maintaining high breeding efficiency and selecting superior replacements are necessary to reach this level.

Raising and selecting replacement gilts

A steady supply of replacement gilts is required to replace sows which die or are culled because of poor production. Plan to replace 30 to 35 per cent of your sow herd annually.

Breed choice The crossbred female is preferred for commercial production because they have the added advantage of hybrid vigor (Heterosis). Heterosis on the female side produces higher productivity in the low-heritable traits such as litter size, or mothering ability.

Maximum hybrid vigor for female reproductive ability is achieved by crossing two breeds of diverse origin. In commercial herds, the most popular cross is the Yorkshire-Landrace. Generally, Yorkshire, Landrace, Lacombe and Duroc have the best reproductive performance and should be considered for producing crossbred gilts.

TABLE 1. SERVICE FREQUENCY FOR BOARS

	Breeding Frequency	
	Junior Boar (8 months to 1 year)	Senior Boar (more than 1 year)
Services per:		
Day	1	2
Week	5	7
Month	20	30

Source of breeding stock One method of obtaining breeding stock is to select replacement females from within your herd. In this way, the animal's history, and how it was raised and tested under your environment and management, is known. As well, there is less risk of disease, a continuous supply of females is maintained and small groups or individuals can be injected into the breeding herd when required.

If adequate improvement cannot be made by selection within the herd or you do not wish to devote the extra time in raising and selecting replacements, obtain quality females from outside sources.

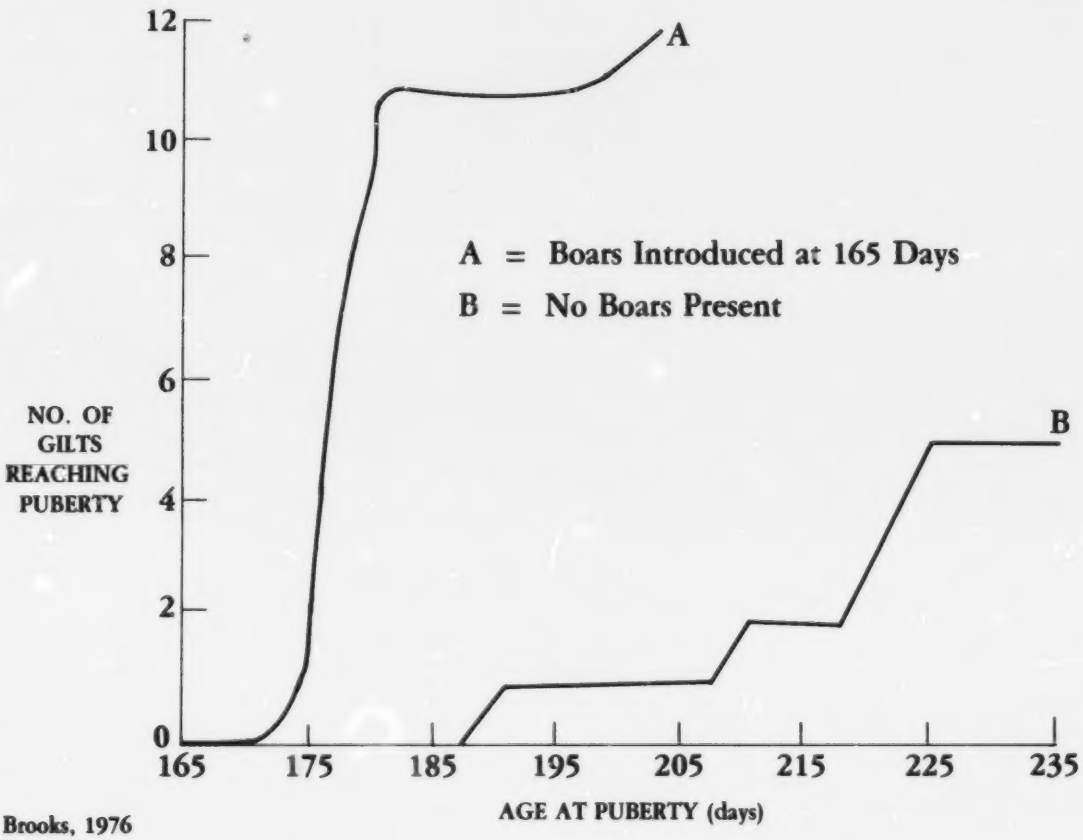
Management of developing gilt Identify potential replacement females from large, healthy uniform litters by an ear notch or tattoo during the first two weeks of age. Keep a record of sire and dam, birth date, and litter or piglet numbers for future reference. Identify more potential replacements than you expect to select.

Raise potential gilt replacements in all-female groups in dry, well ventilated pens that provide 0.56 to 0.74 m^2 (6 to 8 ft^2) of floor space per animal. Self-feed a 16 per cent grower ration until the group averages 90 kg (198 lbs). Base final selection of replacement gilts on their individual record of performance as well as physical and structural soundness.

Gilt performance Concentrate on traits that are measured accurately, highly heritable and of the most economic importance (example, growth rate and backfat thickness). Proper management and crossbreeding will improve the low heritable reproductive traits.

To help choose the top gilts, set up an on-the-farm gilt testing program or enroll on one of the provincially-sponsored home test programs. In either case, animals in the gilt pool (potential replacements) should be raised and tested under the same conditions. At market weight or approximately

FIGURE 1. INFLUENCE OF BOAR CONTACT ON GILT AGE AT PUBERTY



Brooks, 1976

90 kg ± 13 kg (198 lbs ± 29 lbs) liveweight, weigh the gilts and probe for backfat thickness. Selections should then be based on a composite performance index of two traits, age in days and average backfat thickness, adjusted to 90 kg (198 lbs).

NOTE: For more information on the home test programs review Lesson 2 or consult your regional livestock specialist.

Physical soundness Be sure selected gilts are physically sound, and have at least 12 but preferably 14 prominant, evenly spaced teats with three pairs of teats placed well forward or in front of the navel.

Selection and culling levels Once replacement gilts are selected, ear tag them for easy identification and pen as a separate group. Choose 10 to 20 per cent more gilts than are actually required for herd replacements to ensure enough breeding females. Cull any gilts that do not settle or which fail to come into heat by one month after the main group. During the hot summer and fall, when conception rates may be lower, select additional gilts to compensate for this reduced breeding efficiency.

Pre-service management of replacement gilts

Flushing Increasing the feed intake (flushing) of gilts to 3.5 to 4.0 kg (7.7 to 8.8 lb) for 10 to 14 days before service will increase the number of eggs ovulated if they were limit fed 2 kg (4.4 lb) per day before flushing. However, the increase in ovluation rate is usually offset by lower embryonic survival so that litter size at farrowing is not improved. A better practice is to feed the gilts 2.5 to 3.0 kg (5.5 to 6.6 lbs) of a 14 per cent gestation ration daily throughout the pre-service period.

Early breeding To increase reproductive efficiency, breed gilts at an earlier age and weight than the normally suggested eight months and 113 kg (250 lbs). Gilts can be induced into puberty at an earlier age through early contact with boars and other stimuli.

A boar stimulates the gilt to reach puberty by sight, sound, smell and physical contact. Physical contact is the most important of these. The effect of boar contact, at 165 days, on gilt age at puberty is shown in Figure 1. In the boar contact group, 11 of 12 gilts reached puberty (showed signs of the first heat cycle beginning) within 12 days of mixing and boar contact. In the no boar contact group, only five out of the 12 gilts reached puberty by 225 days.

Stressing pre-puberal gilts through transport and a new environment, causes many to come into heat earlier. A similar response is obtained by moving confinement reared gilts to outside lots.

For greatest success in early breeding of gilts, expose gilts to the following stimuli at the same time:

- transfer to a new pen or barn.
- mix with strange gilts. Allow 0.74 m^2 (8 sq. ft) of space per gilt and no more than 8 to 10 gilts per pen.
- contact with a boar.

Direct contact with a boar is essential for maximum stimulus. This is obtained by allowing a boar into the gilt pen for half an hour to an hour each day until a response is observed. To prevent the gilts from being served, supervision is required. Record dates of standing heat and serve on the third standing heat.

However, do not begin boar contact until gilts are about 150 days of age and 68 kg (150 lbs) in weight. Continuous contact with boars before this age seems to cause a delay in puberty. Also, gilts become conditioned to a boar if the same one is always used. Using several boars on a daily rotation will overcome this conditioning effect. With this method, gilts can be induced to reach puberty by 160 days of age. A second or third estrus is reached by seven months and 100 kg (220 lbs) weight. Servicing gilts at this earlier age and lighter weight does not reduce their reproductive performance if breeding is done at the third heat period as shown in Table 2.

TABLE 2. WEIGHT AND BREEDING PERFORMANCE OF GILTS

	Time of Mating		
	First Heat	Third Heat (Market Weight)	Third Heat (Heavier Weight)
Weight (kg) of gilt	77.1	96.5	115.8
Litter size	7.9	9.3	9.9
Birth weight (kg) of piglets	1.15	1.23	1.23

Lifetime performance of early bred gilts

Does the gilt bred at an earlier age have a lower lifetime productivity? Work done at the Seale Hayne Agricultural College in England suggest there is no difference in lifetime productivity. Results are presented in Table 3.

Management of newly purchased gilts

Acquire purchased gilts 50 to 60 days before breeding to allow time to check health status through veterinary inspections and tests. Isolate individuals at least 30 days in cleaned and disinfected quarters located several hundred feet from the rest of the herd.

Before adding replacements into the breeding herd, vaccinate for leptospirosis and erysipelas, treat for internal and external parasites (roundworms, mange, lice) and identify with ear tags.

After 30 days, if the females are healthy, introduce them into the swine herd so they become immune to organisms in the new environment before breeding. Doing this prevents abortions, mummified pigs and stillbirths.

Management at breeding time

Developing a breeding schedule Determine adequate boar power by considering the number of services required per week, not the number of sows per boar. Using a 100 sow herd as an example, the objective should be 200 plus farrowings per year. For maximum efficiency, breedings and farrowings should be as even as possible throughout the year. Not counting for breeding failure, 200 plus farrowings require 17 sows to be bred each month, or four per week. Considering the normal 15 per cent failure rate, 20 sows are needed for breeding each month, or five per week. Each sow should be served twice, so this doubles the breedings, up to 480 per year, or 40 per month or 10 per week. Be sure to allow adequate boar power when breeding a group of weaned sows at the first post-weaning heat period because most will tend to cycle within four to seven days after weaning. There is a chance all will be in heat on the same day.

Mating systems Mating systems vary as to amount of labor involved, ease of obtaining accurate breeding records and facility requirements.

Hand mating This is the preferred mating system. The operator checks for heat and takes the females in heat to the boar. Its advantages are:

- the operator knows for certain if the female was bred
- accurate breeding dates can be recorded
- the operator can accurately check for returns to heat
- boar use is regulated
- anestrus problems can be determined earlier
- a more accurate sire performance can be calculated
- fewer boars are required for the same number of females

The main disadvantage is that more intensive labor and observation is required.

Pen mating Here a boar runs with a group of females. Although less labor intensive, more boar power is required. In a pen mating system, one mature boar can handle eight to ten females in a 21 day breeding period. A young boar (eight to 12 months of age) can effectively service from four to six females in the same period.

For a group of sows weaned on the same day, use one mature boar for four females or one young boar for every two females. To prevent non-pregnancy due to an infertile boar, rotate boars daily between sow groups.

The main disadvantage of a pen mating system is that records of breeding dates, boar service rate and female return to heat dates are often unknown, except when the herdsperson observes a mating.

TABLE 3. PERFORMANCE OVER 5 LITTERS OF SOWS ON 2 MATING SYSTEMS*

	Early Mating	Conventional Mating
Pigs born alive	51.6	50.4
Pigs weaned	42.6	43.8
Average birth wt. (kg)	1.20	1.13
Average wean wt. (kg)	9.16	9.13

*All Gilts Bred at Second Heat
Brooks, 1977

Heat (Estrus) detection Proper and accurate heat detection is important for a successful mating system. Physical signs of estrus for female swine include:

- The vulva may be swollen and red. As the sow or gilt approaches standing estrus, a clear, viscous vaginal discharge may be observed.
- The sow or gilt shows increased interest in the boar and may permit other females to mount.
- When pressure is applied to the female's back, the female exhibiting estrus remains stationary with its ears becoming erect. If the sow is approaching or at the end of standing estrus, she will move around and will not permit the boar to mount, although there may be an interest in the boar.

Check for heat twice daily, especially for gilts. It is questionable whether boars by themselves do a quick, accurate job of detecting heat when they are "paraded" behind a row of sow stalls or introduced into a pen of females. Some boars spend too much time investigating their new surroundings or individual females not in heat.

Heat detection is best done by introducing a boar, followed by the producer doing the riding test on the females (Figure 2). Females in good standing heat will respond by allowing you to sit on their back. They will stand solidly and "pop" their ears back. Also, look for behavioral changes as well as reddened and swollen vulvas.

Other management factors Synchronization of heat is relatively simple with sows. Sows tend to exhibit standing heat four to seven days after weaning if the pigs have nursed for three to four weeks. Sows may also exhibit heat during lactation if the pigs nurse beyond five to six weeks. Gilt heat cycles are more difficult to synchronize. Movement to a new location, regrouping and direct boar contact stimulate estrus.

Breeding is the all-important factor for successful pig production. Regardless of the breeding method, if adequate numbers of sperm are not present a few hours before ovulation, conception rate and litter size is reduced. Standing heat lasts about 48 hours with ovulation taking place 30 to 40 hours after the

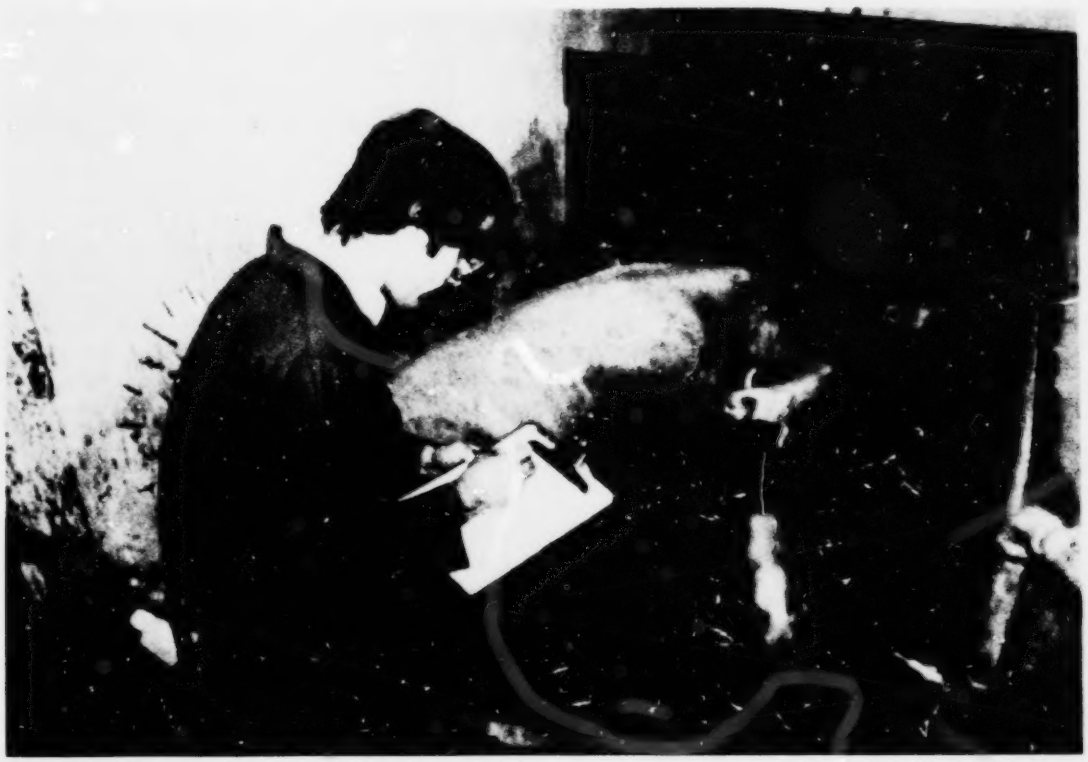


FIGURE 2.

beginning. To fertilize maximum ova (eggs), breed sows late on the first day of heat and again 12 to 14 hours later. Gilts tend to exhibit a shorter estrus cycle so breed them as soon as they are observed in heat, and thereafter 12 hours apart for as long as they will accept the boars.

In commercial enterprises, to guard against infertility in any one boar, use two different boars for the two services on each female.

Keep an accurate record of females bred, breeding dates and the boars used for service.

Management during gestation

The normal gestation length of swine is 114 days with a range from 110 to 118 days. Using a gestation length of 114 days, the expected date of farrowing can be calculated from the listing in Table 4.

Housing and environment Developments in intensive sow housing systems were slow compared to those in grower-finisher operations. Previously, exercise and large pen size were considered essential for normal reproductive performance. Now, many herds are on a total confinement system. In most cases, confinement of sows results in an easier system of management, reduced feed costs, lower culling rates (because of less fighting) and a probable reduction in prenatal losses.

After breeding, group the sows according to the stage of pregnancy to make gestation management more systematic. Do not mix gilts with mature sows and keep group size as small as possible. Maintain dry, comfortable, well-ventilated quarters. Avoid any stress-producing situations, especially during the first three weeks after breeding. Stress at this time increases embryonic mortality. Sows housed in groups can tolerate a temperature as low as 10°C (50°F). If dry sows are housed in stalls or tethers, keep the temperature between 15 and 18°C (59°F to 64°F). Temperatures above 24°C (75°F) may cause heat stress.

When sow stalls are used, partially slatted floors are recommended to insure a dry area for the sow, and

TABLE 4. GESTATION TABLE (BASED ON 114 DAY GESTATION PERIOD)

Breeding Date	Expected Farrowing Date	Breeding Date	Expected Farrowing Date	Breeding Date	Expected Farrowing Date
Jan. 1	Apr. 25	May 1	Aug. 23	Sept. 1	Dec. 24
Jan. 5	Apr. 29	May 5	Aug. 27	Sept. 5	Dec. 28
Jan. 10	May 4	May 10	Sept. 1	Sept. 10	Jan. 2
Jan. 15	May 9	May 15	Sept. 6	Sept. 15	Jan. 7
Jan. 20	May 14	May 20	Sept. 11	Sept. 20	Jan. 12
Jan. 25	May 19	May 25	Sept. 16	Sept. 25	Jan. 17
Jan. 30	May 24	May 30	Sept. 21	Sept. 30	Jan. 22
Feb. 1	May 26	June 1	Sept. 23	Oct. 1	Jan. 23
Feb. 5	May 30	June 5	Sept. 27	Oct. 5	Jan. 27
Feb. 10	June 4	June 10	Oct. 2	Oct. 10	Feb. 1
Feb. 15	June 9	June 15	Oct. 7	Oct. 15	Feb. 6
Feb. 20	June 14	June 20	Oct. 12	Oct. 20	Feb. 11
Feb. 25	June 19	June 25	Oct. 17	Oct. 25	Feb. 16
Feb. 28	June 22	June 30	Oct. 22	Oct. 30	Feb. 21
Mar. 1	June 23	July 1	Oct. 23	Nov. 1	Feb. 23
Mar. 10	July 2	July 10	Nov. 1	Nov. 10	Mar. 4
Mar. 15	July 7	July 15	Nov. 6	Nov. 15	Mar. 9
Mar. 20	July 12	July 20	Nov. 11	Nov. 20	Mar. 14
Mar. 25	July 17	July 25	Nov. 16	Nov. 25	Mar. 19
Mar. 30	July 22	July 30	Nov. 21	Nov. 30	Mar. 24
Apr. 1	July 24	Aug. 1	Nov. 23	Dec. 1	Mar. 25
Apr. 5	July 28	Aug. 5	Nov. 27	Dec. 5	Mar. 29
Apr. 10	Aug. 2	Aug. 10	Dec. 2	Dec. 10	Apr. 3
Apr. 15	Aug. 7	Aug. 15	Dec. 7	Dec. 15	Apr. 8
Apr. 20	Aug. 12	Aug. 20	Dec. 12	Dec. 20	Apr. 13
Apr. 25	Aug. 17	Aug. 25	Dec. 17	Dec. 25	Apr. 18
Apr. 30	Aug. 22	Aug. 30	Dec. 22	Dec. 30	Apr. 23

to reduce cleaning time. The edges of the slats should be rounded to avoid damage to feet. In a penning situation, allow about 1.85 m^2 (20 ft^2) per bred sow or gilt. Stall measurements of about 0.56 m (1.8 ft) x 2.13 m (7 ft) are recommended.

Do not tether or stall gilts before first service. Close confinement before first service may result in failure to show heat and a wide variation in the age at which they reach puberty. Other problems produced by tethering or stalling gilts are restlessness, neck sores, leg problems and difficulty in maintaining cleanliness. Individual confinement is suitable for first litter and older sows that have been rebred.

Feeding levels Feeding a nutritionally balanced gestation diet at the correct level is crucial to having females in proper condition at farrowing. The nutrient requirements of gestating sows and gilts are for normal body maintenance, some growth or gain in weight of the female if required, and the development of the litter.

Normally, 1.8 to 2.3 kg (4 to 5.1 lb) of a 14 per cent dry sow ration will meet the daily nutrient requirements of a gestating sow. This assumes sows are individually fed and free of heavy parasite infestation. If sows are outside or in cold quarters (less than 10°C/50°F) these feed intake levels may need to be increased by 25 per cent.

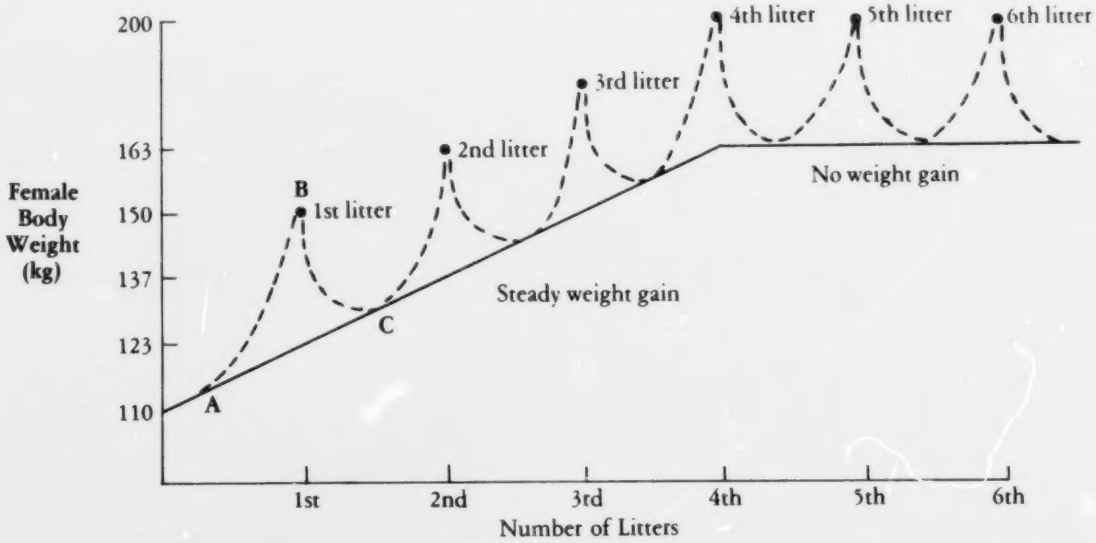
Feeding enough to meet nutrient requirements usually means limiting the feed intake of pregnant females so that they do not become too fat. Limit feeding refers to energy reduction without a reduction of nutrients such as protein, calcium, phosphorus, trace minerals and vitamins.

Overfeeding is as harmful as underfeeding. Both result in reduced thriftiness, increased piglet mortality and smaller weaned litters. Overweight sows have increased embryonic mortality, greater farrowing difficulties and are clumsy. They tend to lay on and crush more pigs. Overfeeding during gestation is also wasteful and costly in producing a litter of pigs. Since feed is a major cost of production, your sow feeding program could very well make the difference between profit and loss.

NOTE: Feeding requirements presented must be considered as guidelines. Actual feed allowance will depend upon the composition of the ration and the conditions under which the sows are kept. It is important to keep a watchful eye on the sow herd and adjust the feeding levels as the need arises.

Feeding methods Daily individual or hand-feeding is recommended for feeding bred sows and gilts. This allows control over the amount of feed consumed by each animal. The condition of each animal is adjusted by increasing or decreasing feed

FIGURE 3. RECOMMENDED SOW BODY WEIGHT CHANGE



A — Weight of gilt at breeding
B — Weight of gilt before farrowing first litter
C — Weight of gilt after weaning litter

intake as required. To work properly, each animal must have a separate feeding stall. It can also work fairly well where animals are grouped in pens if there is access to individual feeding stalls or where a large feeding area is used to reduce competition from "boss" sows.

If individual hand-feeding is not possible, an interval feeding program is one alternative. Here sows are allowed access to a self-feeder for only a certain period of time. They eat to appetite and then must fast until the next feeding. Sows eat as much as they can in one or two hours every other day, or in a 12 hour feeding period every third day. Accurate control over feed intake is difficult so some trial to measure feed consumption is recommended.

In recent years, interest has been shown in self-feeding a low energy diet. Sows are given access to low energy feeds such as grains diluted with hay, silage or other low energy feedstuffs. These rations have been satisfactory if used with specially formulated mineral-vitamin premixes and followed by a high protein, high energy lactation ration. However this method of feeding is questionable, since feed costs are higher because sows will eat about twice as much total gestation ration. Also, the mechanical handling of these rations is more difficult.

Weight during gestation Weight gain during gestation should be about 27 kg (60 lbs) for mature sows and about 41 kg (90 lbs) for gilts and younger sows. The weight loss at farrowing (litter weight and fluids) is about 22 to 27 kg (49 to 60 lbs). After the fourth litter, there should be little, if any net weight gain. A sow's body weight should be about 163 kg (359 lb) after weaning for each successive reproductive cycle. Figure 3 shows the recommended body weights and weight changes of gilts and sows during their reproductive cycles.

Checking returns to heat The average length of the estrus cycle of a sow is 21 days. Routinely check for returns from 18 to 24 days after breeding. Also watch for animals that may return to heat at other times. This can be caused by early embryonic death, abortion or abnormal reproduction cycles.

Preganancy checking Very few people are able to visually determine if a sow is pregnant until about the eighth week. Ultrasonic pregnancy detectors are available to aid in earlier diagnoses at 30 to 35 days after breeding. An experienced operator, using a reliable machine will be 90 to 95 per cent accurate in detecting a pregnant or open female. Pregnancy detection repeated 60 days after breeding is an advantage in detecting females that resorbed or aborted the developing litter.

An ultrasonic pregnancy detector is a valuable tool in medium to large herds. Reducing the average open time will increase overall reproductive efficiency.

Herd health Watch for any signs of disease or parasites. Treat for internal parasites and manage before farrowing. Follow a veterinarian's recommendation where erysipelas is a problem. Keeping the pregnant sow clean, healthy and comfortable improves her chances of bearing a strong, healthy, vigorous litter of pigs.

Light effect

The importance of light for optimum reproductive efficiency has been investigated by Canadian researchers at the University of Guelph. They have reported that gilts raised with 18 hours of light per day reached puberty earlier than those raised with six hours of light daily. Additional lighting increased the number of piglets farrowed by about 0.8 pigs per litter. These researchers concluded that 14 to 18 hours of light daily is required for confinement sow housing. A simple time clock can be installed to ensure adequate light. The use of natural daylight through windows supplemented with electric light in the winter will satisfactorily meet the recommended levels of light.

Light intensity is also important and should be maintained between 150 to 200 lux (14 to 20 foot candles). One 100 watt bulb every 4 m (13.1 ft) or a row of fluorescent tubes installed directly above the pigs will supply this amount.

Temperature effect

Females are not adversely affected by heat stress before or during estrus. However, high temperatures during implantation (12 to 18 days after conception) causes higher embryonic mortality. As a result, more females may return to estrus due to early pre-natal loss (less than 4 fertilized eggs attached to uterus at implantation stage). Provide shade or sprinklers to keep sows and gilts cool when breeding in very hot weather. Whenever possible, breed early in the morning or late in the evening.

Management of the sow and litter

The farrowing period and the first week of lactation are critical in swine production. Proper management procedures during this time will prevent unnecessary baby pig losses and other complications that reduce profits.

Farrowing systems

There are two basic farrowing systems:

Continuous farrowing Sows to farrow are run through a facility in a continuous flow with no

break for total room sanitation. Individual farrowing stalls are washed and sanitized as the sow and piglets are taken out.

All-In-All-Out batch farrowing system
Groups of sows due to farrow are brought into individual rooms over a short time period. Sows ready to farrow in the next period go to another room. All sows in a room are weaned at the same time. Once the room is empty, cleaning and disinfecting are done before the next batch of sows enter.

Pre-farrowing

Preparing the farrowing quarters Thoroughly clean the total farrowing room or area. Disinfect and leave it unused for five to seven days before the arrival of a new group of sows. When this is not practical, completely clean and disinfect the individual pen, stall or crate before the new arrival. NOTE: Disinfectants are useless unless the cleaning job is complete.

Sow wash Before placing the sow in the farrowing unit, thoroughly wash her with a mild soap solution and rinse with warm water. This removes worm eggs as well as dirt and manure which may be potential sources of diarrhea-producing agents or infection to the nursing pig. To acquaint sows with the new surroundings, place them in the farrowing unit three to five days before the expected farrowing date.

Feeding Feed sows at the same level as they received during gestation. If constipation is a problem, feed a bulky, laxative ration containing 10 to 20 per cent bran, chopped alfalfa or dry beet pulp. If a different ration is to be fed after farrowing, this is a good time to make the change. Avoid stresses that could cause the sow to go off feed.

Predicting time of farrowing Recorded breeding dates, calculated farrowing dates and close observation during late pregnancy are helpful in predicting farrowing time. The presence of milk usually means farrowing will happen within 24 hours. Milk color may be grayish at first but will turn white as farrowing approaches. The sow may also be restless, nervous, try to escape the crate, chew on anything available, urinate frequently or attempt to build a nest.

Induced farrowing Two commercial injectable products have been released for use in controlling the timing of farrowing. Both are synthetic prostaglandins that induce farrowing, usually about 24 to 36 hours after administration. Research in England showed that up to 95 per cent of sows farrowed within 36 hours of treatment. This suggests that a majority of farrowings can be induced to occur during the working day so that weekend and nighttime forrowings are avoided.

Both are prescription products available through your veterinarian. To use them properly and safely, accurate breeding records and gestation data are needed. Inducing farrowing too early can increase piglet mortality markedly.

Induced farrowings enable producers to be present at these events during a convenient time. Losses associated with farrowing, such as crushing, chilling or suffocation should be reduced. As with any product, producers must balance the cost of the product against its benefits.

Farrowing

The birth process The birth process ranges from 30 minutes to more than five hours. Pigs may be born either head first or rear feet first; both are normal. Some fetal membrane may partially cover the newborn pig, but after-birth generally occurs in a larger amount near the end of farrowing. The average interval between birth of individual pigs is about 15 minutes but may vary from simultaneous to several hours.

Supervised farrowings It is a good practice to be on hand when sows farrow or at least make frequent checks on them and the litters during the first 24 hours. This attention can prevent some stillbirths, pigs can be freed from membranes, weak pigs may be revived and care can be given that reduces other deaths in the first week after farrowing. On the other hand, too much attention to a nervous sow may do more harm than good. In this case, do not disturb her if things are going normally.

Care of sow

1. Keep farrowing room temperature between 19° and 22°C (66° and 72F°).
2. Clean the sow's udder and remove any plugs at the teat ends. This prevents foreign material or bacteria from gaining quick access to the piglet's digestive tract and causing infection.
3. Provide assistance in delivery of pigs only when signs indicate the sow's inability to deliver unassisted. A general rule is to assist the sow if she has labored strenuously for more than 30 minutes between piglets. Procedures include:
   - Insert well-lubricated gloved hand and arm into the reproductive tract as far as needed. An alternative is to use your bare hand and arm; thoroughly wash with soap and warm water, disinfect and lubricate with vaseline.

TABLE 5. PIGLET MORTALITY OF SOWS AND GILTS ON 76 ILLINOIS FARMS.

	Total (No. of pigs)	Percent of Pigs Born
Pig deaths prior to first observation/litter	0.70	7.1
Pig deaths after the first observation	1.79	18.2
Mean pig deaths/litter	2.49	25.3

Cause of pig deaths prior to the first observation (stillbirths)

	Percent
Apparently normal	75.1
Mummified fetuses	15.8
Other causes	9.1
Total	100.0

Cause of pig deaths after first observation (other than stillbirths)

	Percent
Crushing	30.9
Starvation	17.6
Born weak	14.7
Chilling	5.5
Transmissable gastroenteritis	3.9
Other diarrheas	12.9
Pneumonia	1.4
Others	13.1
Total	100.0

Lemen and Knudson, 1972

- Gently push one pig back or free the crosswise piglet blocking delivery. Grasp the piglet and gently but firmly pull to assist delivery.
- Upon completion of farrowing, inject an antibacterial solution to prevent infection.

Note: Call a veterinarian if you are unable to cope with the problem.

4. Using oxytocin to hasten rate of delivery is helpful if correctly administered and if farrowing is proceeding slowly but normally. Do not use until the birth of one or more pigs has occurred and then only if more than 30 minutes has elapsed after the birth of the previous pig without the birth of another or without expelling membranes that indicate farrowing is completed. Avoid using oxytocin if the sow experiences prolonged labor and straining without delivery. This indicates that a pig is blocking the birth canal.
5. For "hysterical" or vicious sows, remove piglets to a warm place until farrowing is completed. This abnormal condition generally subsides in a few hours. Test the sow by placing only one piglet with her and watching her reaction.
6. Check the sow's temperature immediately after birth and every 12 hours for two or three days. Treat sows which have abnormal temperatures (40°C/104°F or higher) fail to eat or milk, have abnormal discharge, or are sluggish.
7. Watch that the sow's udder is not hard, inflamed or feverish. If this condition is common develop a prevention and treatment program.

Care of newborn piglet

1. Occasionally a piglet is enclosed in the afterbirth material and will suffocate if not removed. Free newborn pigs from the surrounding membrane by gently breaking it

with clean hands. Then clean the mucous from their nose and mouth. Some pigs, apparently dead, can be revived by brisk massage or blowing air into their lungs.

2. If the temperature is cold, dry off newborn pigs with clean cloth and place them under a heat lamp to prevent chilling.
3. Dip or swab navels with tincture of iodine immediately after birth.
4. Provide a zone-heated area where the temperature is 29 to 32°C (84 to 90°F) for the first week; 2.7°C (5°F) cooler for the second week; and another 2.7°C (5°F) cooler for the third week.
5. Be sure all piglets suckle within the first few hours. The first milk or colostrum, contains antibodies to help the piglet defend against disease organisms. Colostrum is only available from the mother for the first 24 hours. Since the piglet's gut can only absorb antibodies for the first 24 to 36 hours, the newborn pigs need as much time as possible to suckle after being born. This increases colostrum consumption.

Causes of baby pig losses Surveys from Canada, the United States and Europe show that 20 to 25 per cent of all pigs farrowed die before weaning. Stillbirths, weakness, starvation, overlaying and disease cause most baby pig mortality. (Table 5).

Between 50 and 70 per cent of all preweaning losses occur during the first three days, with the greatest daily loss occurring on the first day (Table 6).

Reducing piglet losses will improve overall reproductive performance. Common causes of baby pig mortality include:

1. *Stillbirths* Stillbirths or pigs dead prior to first observation account for five to seven per cent of all pigs born. Most stillborn pigs are alive before farrowing begins. The major cause of death is suffocation during birth. Often the placenta becomes detached or the navel cord breaks before delivery, cutting the oxygen supply. Eighty per cent of all stillbirths occur during the last third of the litter to be farrowed. Some pigs that are found dead could be saved with an attendant present during delivery.
2. *Chilling, weakness, starvation and crushing* These factors, which are closely related, cause most piglet losses since pigs that are chilled, small, weak or which do not suckle are very prone to being crushed by the sow.

Baby pigs are very small compared to their dam, and have a large surface area for their weight. They have very little fat and virtually no hair coat. They have sufficient body reserves of glycogen to keep warm for only seven to eight hours, making them very prone to cold stress. This makes adequate nourishment necessary.

Baby pigs require an air temperature of 32°C (90°F) or they have to use body reserves to maintain normal body temperature. A zone-heated creep area, that is dry and draft-free is very important in preventing chilling. An enclosed creep area with heat lamps gives a separate micro-climate best suited for very young pigs.

In medium to large litters, an intense competition takes place among the piglets for food supply. Piglets will initially try to obtain front teats because they are large, well-spaced and may yield more milk.

TABLE 6. BABY PIG DEATHS IN RELATION TO THE TIME SINCE PARTURITION.

Days from Parturition	No. of Deaths	Deaths as Percent of Total
1	302	46.7
2	77	11.9
3	75	11.6
4	40	6.2
5	19	2.9
6	11	1.7
7	9	1.4
8 - 14	32	4.9
15 - 28	39	6.0
29 - 56	43	6.7

Pomeroy, 1960.

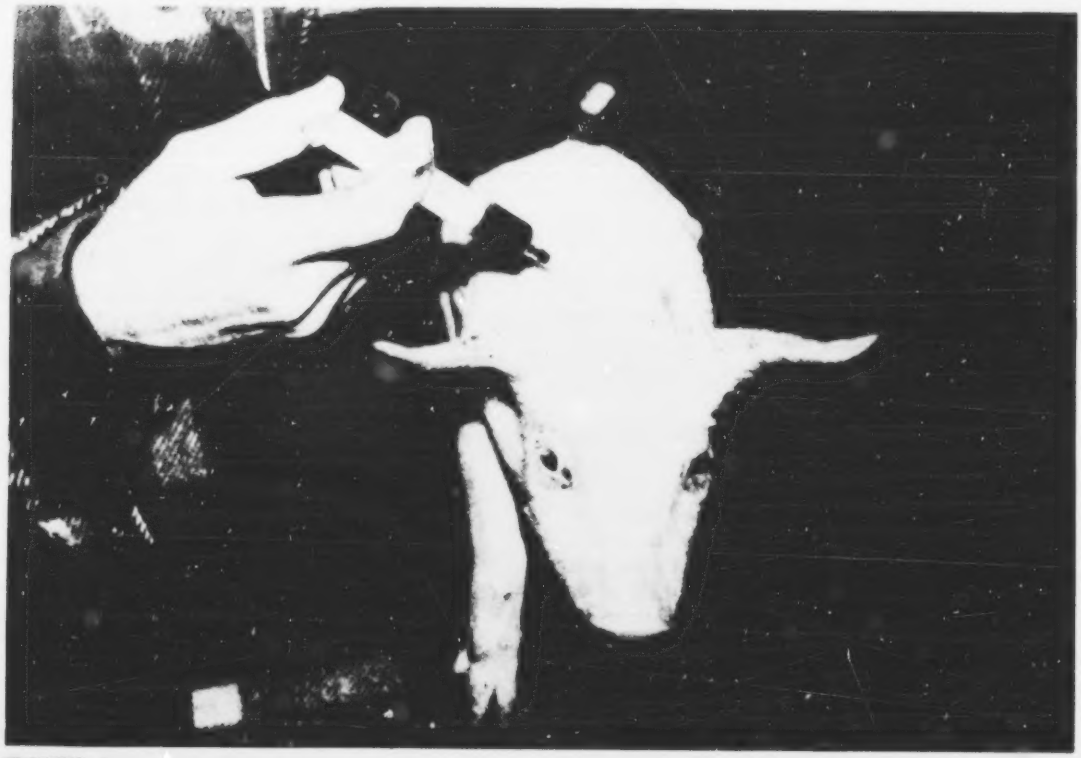


FIGURE 4.

Smaller pigs are weaker and often forced to accept poorer rear teats. If the teats are not exposed or functional, they get little nourishment. These piglets soon get weaker and become the "runts" of the litter. Watch closely to make sure all pigs are suckling regularly.

Crushing causes 20 to 30 per cent of pig mortalities. In many cases of overlaying, the piglets are already weak from starvation or chilling and are unable to avoid being crushed. Some larger, stronger pigs are also crushed. Often this occurs when awkward, clumsy sows flop down or when they kick and struggle to get up.

3. *Disease* Disease causes 10 to 15 per cent of all baby pig losses. Scours and pneumonia are the biggest killers. Prevention through good sanitation and proper environment will reduce disease incidence and baby pig losses. If an outbreak occurs, identify it early and follow recommended treatment methods.

4. *Other factors* Also influencing baby pig mortality are litter size, variation in piglet weight and weight at birth. Mortality is generally greater in large litters, in litters with greater pig weight variation and in litters where piglets weigh less than 0.9 kg (2.0 lbs) at birth. Table 7 shows the relationship between birth-weight and piglet mortality.

Note: The danger period for the newborn piglet is the first 72 hours of life. If the piglet is kept alive

TABLE 7. RELATIONSHIP OF BIRTHWEIGHT TO MORTALITY.

Birthweight (lb.)	Total Born	Mortality to Weaning (%)
up to 1.9	130	74.6
2.0 to 2.9	440	21.6
3.0 and over	339	11.0

English, 1974

and healthy for that period, the chance of survival is greatly increased.

Baby pig management

Navel and joint infections Bacteria can gain access to the piglet's body through the navel or wounds such as skinned knees. Often this causes navel or joint ill. The infection becomes localized in the navel area, in joints and areas of poor circulation. (Figure 4). Swelling and lameness result.

Sanitation of the piglets' living quarters is important in preventing bacteria build-up. Floors and raised pads should not be too rough, but not too smooth as to cause slipping, scraping and injury. Keep farrowing pen floors dry and as clean as possible.

To prevent entry of disease organisms, treat navels with iodine disinfectant soon after birth. If pigs are bleeding excessively from the navel cord, clamp or tie the cord within 25 mm (1.0 in) of the body using umbilical tape or string. Also, disinfect docked tail areas, castration wounds and abrased knee injuries. If infection does occur, use an antibiotic injection to counteract it.

Needle teeth Baby pigs have four pairs of small sharp teeth, two on each jaw, top and bottom. These needle teeth are of no practical value to the pigs, but may irritate the sow's udder during nursing. They may also cause injury to other pigs when they fight or play among themselves. To avoid this, cut the needle teeth at birth but do not clip too closely or gum injury will result. A side cutting clippers works best (Figure 5).

Tail docking This can be done if tail biting is a problem. Cut the tails 1 cm (0.4 in) from the base with a clean side-cutting pliers and disinfect tail stub. Docking is best done when piglets are only a day old or when iron shots are given.

Identification Perform ear notching within the first 24 hours and tattooing within the first 10 days to establish identity (Figure 6). When done early there is less bleeding, less stress on the pigs and the animals are easier to handle. Ear notching systems are illustrated in Lesson 2.

Iron injection Iron is essential for normal hemoglobin formation in the blood and the prevention of nutritional anemia. Pigs are born with a limited iron reserve because of poor placental transfer of iron to the fetus. Rapid growth and blood formation soon deplete these reserves as a baby pig will double in weight in the first week. Iron deficiency occurs rapidly in newborn pigs reared in confinement. This happens because sow's milk is low in iron

FIGURE 5. CLIPPING PIGLET'S NEEDLE TEETH

FIGURE 6. EAR NOTCHING

and they do not come into contact with soil or other iron sources.

Supplemental iron is required by the baby pig within the first 48 to 72 hours of life to prevent anemia. The most common and preferred method is to inject 150 to 200 mg of iron-dextran into the muscular tissue. The area around the neck or under the foreleg is preferred over the ham area. Iron injections in the ham area often cause yellow stained hams at slaughter. Use clean needles and aseptic techniques. Do not inject pigs less than 24 hours old or give overdoses of iron to young pigs as it may induce shock.

Iron-dextran compounds are available commercially, and generally in concentrations of 100 to 150 mg of iron per cc. A single 1 or 2 cc injection provides protection until iron-containing dry feed is eaten in significant amounts at about three weeks of age.

Cross-fostering This is done when some litters are very large or the piglet size is uneven in several litters. It is also done when sows lack functional teats or adequate milking ability. Cross-fostering is best done within the first three to four days, after the baby pigs have received colostrum. Rubbing the pigs with a strong smelling substance such as talcum powder helps to mask the odor of the strange pig. Transfer the bigger piglets in the litter, not the runts.

Orphan pigs Commercial milk replacer or a home made formula can be used to raise orphan pigs or extra pigs from large litters. Raising pigs in this manner is time consuming, requires extremely sanitary conditions, and is feasible only if they get colostrum from the sow or some other source of first milk such as cow colostrum.

Feed orphan pigs at least six times daily for a few days to stimulate normal nursing patterns. The milk solution must be fresh and warmed to body temperature.

Formula For Orphan Pigs

Cow's milk	1 Litre (approx. 1 qt)
Water	1/2 Litre or 500 mL (approx. 1 pt)
Syrup or honey	8 mL (approx. 1 tbsp)
Antibiotic supplement (soluble)	0.25 grams of antibiotic (approximately)

Knee abrasions Little pigs often develop sores on their knees from struggling on a concrete floor while suckling. The condition is most common when the sow is a poor milker and the floors are rough. Piglets usually recover spontaneously, but if an infection arises, inject an antibacterial agent as prescribed by a veterinarian.

Castration Castrate male pigs before 10 days. At this stage, they are easier to handle and there is less stress. Pigs will recover sooner and the smaller wound will be healed prior to weaning. Use a sterile knife, clean and disinfect hands thoroughly, and disinfect the pig's scrotum. Make the incisions low enough on the scrotum for proper drainage.

Feeding the young piglet For the first few days, colostrum and milk, if in adequate supply, is all the piglet needs. Provide small amounts of creep or starter feed at about one week of age in a place away from the sow. Do not allow creep feed to build up, as it soon takes on moisture and odors, becoming unpalatable. Provide small amounts daily. Remove any feed left from the previous day and give it to the sow. Locate drinkers to supply water in the lower part of the farrowing stall or pen.

Feeding the sow during lactation

Increase feed intake as a sow's nutrient requirements are much higher during lactation. At peak of lactation a sow produces about 7 kg (15.4 lb) of milk daily. Hand feed the sow a 14 to 15 per cent crude protein nursing ration, twice daily. The amount of feed required depends on the number of pigs nursing. Generally, 2 kg (4.4 lb) plus 0.4 kg (0.90 lb) per piglet nursed should be fed to the sow daily, as a maximum. For example, a sow nursing eight pigs would receive 2 kg + (0.4 kg x 8) = 5.2 kg (11.4 lb) daily. For sows nursing very large litters, losing condition, or in poor condition at farrowing, full feeding may be necessary.

Avoid overfeeding for the first few days after farrowing. On the day of farrowing, the sow's appetite will be depressed so feed only 2 kg (4.4 lb) plus free choice water. Bran or dried beet pulp may be included in the feed for a few days. Increase the sow's feed by 0.5 kg (1.1 lb) each day, until the maximum is reached. Maintain the lactating sow at this level until the day of weaning. If weaning is to take place later than 35 days, decrease the feed allowance by 0.5 kg (1.1 lb) per day to 3.0 kg (6.6 lb) per day at day 42 of lactation.

Feed consumption and body weight changes during lactation depend on the sow's condition at the start of lactation. Fat sows tend to consume less feed and lose more weight than thin sows. Feed is more efficiently used when milk is produced by current feed intake than by depending on body fat reserves. This is achieved by controlling energy intake during gestation to limit fattening and by full-feeding during lactation to keep to a minimum the use of fat reserves for milk production.

Lactation length

A very important decision in sow management is the lactation length or weaning age. The length of the lactation period influences the number of litters produced annually by a sow. Most producers wean their pigs between four and six weeks of age, but lactation periods of 0 to 56 days have been tried. In theory, shorter lactations should result in increased numbers of pigs produced per year. In practice, however, the benefits of short lactations are less obvious. As lactation length is reduced, sows take longer to come into heat.

A more serious consequence of short lactation is the effect on conception rate and subsequent litter size. Generally, weaning earlier than the 17th day of lactation results in lower conception rates and reduced litter size at birth. Earlier weaning requires better housing and management conditions. Maximum efficiency of production, in terms of pigs weaned per sow annually, feed consumption of the sow and growth rate of the young pig is achieved when pigs are weaned between three and five weeks of age.

Weaning

Except for the first few days of life, weaning is the most stressful period for the piglet. Reducing stress at this time can prevent unnecessary piglet losses after weaning.

Age at weaning Some producers are successfully weaning at three weeks. However, weaning at a younger age increases the number of pigs produced per sow annually provided piglet deaths do not increase. Do not wean pigs weighing less than 5.0 kg (11 lbs). Pigs should weigh 6.8 kg (15 lbs) at weaning and should reach this weight by four weeks.

It may be an advantage to wean litters on the Thursday nearest to the desired weaning age. This helps to avoid having sows in heat on weekends while maintaining a batch farrowing system.

Care of the weaned pig To limit stress at weaning, make changes in feed and environment slowly. Remove the sow and keep the pigs in the same pen for several days. Then remove the pigs to a warm, draft-free weaner area or separate facility. Weaner barn temperature should be at least as high as the pigs were accustomed to in the farrowing barn, from 24 to 27°C (75 to 80°F). Keep a uniform temperature in the weaner barn as a changing temperature may cause more stress and susceptibility to disease. If combining pigs at this time, mix pigs or litters of similar weights. Move smaller, weaker or sick pigs to a separate pen and watch them closely. Provide a floor space of 0.32 m^2 (3.5 ft^2) per pig until they reach 23 kg (50 lbs). With slatted floors and lighter pigs this area can be reduced to 0.23 m^2 (2.5 ft^2) per pig.

Pigs should have the same watering system before and after weaning. Those accustomed to a bowl in the farrowing pen will be slow to adjust to a nipple waterer. A change could reduce water consumption at a time when dehydration must be avoided. Since scour problems frequently occur in the weaner barn, make provision for a manual cut-in on the water line from a separate tank to permit medication of water. Adding an antibiotic to the water supply is the easiest and most effective treatment of scours.

Post weaning pig scours have been linked to a sudden change of environment and diet at weaning. Results suggest that the weaned pig initially goes off feed, then becomes hungry, and tends to overeat. When this occurs, the digestive system is not accustomed to a large intake of any meal and scours result. To prevent this, keep pigs on the same feed once weaned and avoid overfeeding. Keeping them a little on the hungry side for the first week is recommended.

Another nutritional stress is the abrupt change from a milk diet to a dry meal diet. This generally results in a "lag period" (growth check) during which pigs consume very little feed, gain little weight and often suffer from scours. To limit the growth check at weaning, introduce creep feed to the suckling pigs 10 to 14 days after birth. The creep feed provides the necessary nutrients at a time when the sow's milk yield is declining, at three to four weeks after farrowing. Creep feeding may modify the pig's bacterial flora and enzyme systems so that it is able to cope with dry feed.

Feeding sows for rebreeding At one time not feeding or giving water to sows on the day of weaning was thought to stimulate an earlier return to heat. Current recommendation is to feed 1.4 to 1.8 kg (3 to 4 lbs) of feed on the day of weaning followed by 3.6 kg (8 lbs) per day until service. Congestion of the sow's udder is not a factor at this level of feeding. As well, a one-day flushing period at estrus has little affect on reproductive performance.

Sows generally will return to estrus four to seven days after weaning. First litter sows take longer to return to estrus, and conception rate is usually down. Sows that lose considerable weight during lactation are more likely to suffer delays in returning to estrus.

To prevent this problem, feed sows sufficiently during lactation. Sows in proper condition at farrowing should not lose more than 5.0 kg (11 lb) in a four week lactation.

If problems occur in rebreeding young sows (first litter) or sows in poor condition, consider feeding them separately after weaning. Such individuals often need to gain additional weight and return to good body condition before coming into heat.

Anestrus Delays in sows returning to heat and in gilts reaching puberty are known as anestrus. It is a common and costly reproductive disorder. The anestrus problem in sows may be caused by:

- unobserved heats
- hot weather stress
- silent heat (ovulation with no visible sign of heat)
- sickness
- improper nutrition
- social stress

If there is an apparent anestrus problem, make a careful analysis of the management system, feeds, and other factors to determine possible causes. One alternative is to breed a large number of gilts when anestrus is expected to compensate for the lower pregnancy rate. Although this is not a solution, it keeps the farrowing crates full and maintains production at a desired level.

Reproductive efficiency of herd

Records of reproductive performance

In all herds, but especially in larger, more intensive operations, accurate, comprehensive records must be kept to monitor herd reproductive performance. In your records include:

- breeding dates
- service sires
- expected farrowing dates
- actual farrowing dates
- the number of pigs born, alive, stillborn, or mummified
- the number weaned, weaning weight and days to market

Good records allow you to monitor and evaluate each individual animal's performance as well as general herd activity and performance. This production information is essential for analyzing reproductive efficiency levels, assessing the effectiveness of management changes, and providing guidelines for future production goals.

Standards

For maximum efficiency of production it is essential to get the maximum reproductive performance from the breeding herd. The low heritable reproductive traits are greatly influenced by feeding and management. A producer must select the best possible pigs for breeding and then, by proper feeding and management, allow them to express their full genetic potential.

Table 8 shows the average and superior levels of reproductive efficiency in the swine industry. There is certainly tremendous potential for improvement. Achieving increased reproductive efficiency requires an improvement in swine management and environment.

Culling of breeding stock

Culling is an essential part of any genetic improvement program. In a commercial herd, sows will be kept for as long as they produce large thrifty pigs which grow rapidly on a minimum of feed. In evaluating a sow's productivity consider the average performance over her lifetime. Rapid turnover of sows will, however, increase the rate of genetic change and provide faster improvement. The culling and replacement levels for several different programs are given in Table 9. If sows are kept for five or six litters, 40 per cent must be replaced each year. For the purebred breeder, replacement levels will be higher still. Most surveys indicate that replacement rate is actually about 30 per cent.

Guidelines for culling:

Cull sows:

- whenever superior gilts are available for replacement.
- that produce two consecutive poor litters. The heritability of litter size is low and subject to considerable environmental influence. Therefore, one litter provides a poor basis for culling. However, after two poor litters, cull the sow.

TABLE 8. LEVELS OF REPRODUCTIVE EFFICIENCY

	Average	Superior
Baby pig mortality %	25	10
Weaning to mating (days)	11	6
Conception rate %	80	90
Pigs weaned/litter	8	10
No. litters/year	1.8	2.2
No. pigs weaned/sow/year	14.5	22

TABLE 9. EFFECT OF NUMBER OF LITTERS PER SOW ON REPLACEMENT RATE (5 week weaning)

Litters per sow	Years in herd	Annual replacement rate (%)
3	1.3	77
4	1.7	59
5	2.2	45
6	2.6	38
7	3.0	33
8	3.5	29

- that produce pigs consistently below average in growth rate and carcass quality.
- with non-functional udder sections.
- that get too fat and heavy. Fat sows generally have more breeding problems, farrow smaller litters and are poor milkers.
- that do not settle after two matings.
- that develop feet and leg problems.
- that produce offspring with abnormalities such as hernias (ruptures) cryptochidism (ridglings) and atresia ani (no anal opening).
- that have poor temperment as these are often poor mothers and are difficult to handle.

Evaluating a sow feeding program

The nutrition and feeding program of the sow herd must be evaluated in all stages of the reproductive cycle. There are carry-over effects from one stage to the next, thus poor nutritional practices at any stage will reduce the quality of the overall feeding program.

The optimum level of feeding will vary according to:

- size of gilt or sow
- environment
- feeding method and ration composition
- herd health
- sow productivity level
- management standards

Feed requirements for the breeding herd will increase with:

- increased size of gilt and sow
- poor environment
- group feeding
- an unhealthy herd
- increased number of pigs produced per sow annually or lactation length
- poor management

These factors vary greatly from one farm to the next. So it is impossible to give standard recommendations for the different stages of the sow's reproductive cycle for all farms. When evaluating your sow feeding program, consider these guidelines:

- gilts should weigh 140 to 150 kg (309 to 331 lbs) at first farrowing.
- lactation weight loss not to exceed 5 kg (11 lbs).
- a net gain of 11 to 14 kg (24 to 31 lbs) for each successive reproductive cycle up to the fourth litter.
- sow's liveweight by the fourth or fifth litter should be 160 or 170 kg (353 to 375 lbs) at weaning.
- total feed requirements per sow per year not to exceed 1000 kg (2,205 lbs) per sow (indoors) and 1150 kg (2,535 lbs) per sow (outdoors).

Post-weaning management

Management of home raised feeder pigs

The final production stage in a farrow-to-finish operation, growing pigs to market weight, is not as management intensive. Often, good management practices such as proper feeding, handling and sanitation are neglected and can make the difference between profit and loss.

Early stages (starter pigs) Pigs weaned at three to six weeks of age weigh between 4.5 and 11.3 kg (10 to 25 lbs). Feed a starter ration containing 18 per cent crude protein until they reach 25 kg (55 lbs). Deworm pigs once they are well adjusted to dry feed, usually three to four weeks after weaning. If

necessary, treat pigs for mange and lice, by dipping or spraying with a solution of lindane, malathion or another suitable insecticide. Follow manufacturer's directions carefully when using these products.

Grouping pigs To reduce fighting from the mixing of pigs, consider these points:

- Mix as early after weaning as possible.
- Group in lots that are uniform in size and weight.
- Avoid adding one or two pigs to a larger group.
- Mix groups of pigs in a pen new to both groups.
- Feed soon after mixing, as pigs may concentrate on eating and are less likely to fight on a full stomach.

Some producers separate males and females at weaning time or later as pens become crowded. Barrows grow faster, reach market weight sooner and produce poorer carcasses (more fat) than gilts. Feed restrictions or marketing at a lighter weight may be more economic for barrows but it is seldom justified for gilts.

Pen design and density Most finishing pens are rectangular in shape in order to promote the use of separate manuring and sleeping-eating areas. Better use of pen space also is achieved by starting weaners in even batches of about 20 and then dividing them into two even groups again as they become crowded. About 10 pigs per group seems to be optimum during later growth stages. Overcrowding causes social disruption which results in excessive fighting (determining pecking order) and tail-biting. For more information on tail-biting, see the Manitoba Agriculture factsheet, *Tail-Biting in Swine*. The best densities at different weights are:

Pigs Weighing	m^2/pig	ft^2/pig
7 to 23 kg (15 to 50 lbs)	.23 to .32	2.5 to 3.5
23 to 45 kg (50 to 100 lbs)	.37 to .56	4 to 6
45 to 100 kg (100 to 220 lbs)	.56 to .74	6 to 8

With rising building costs many producers tend to overcrowd their growing-finishing pigs. Washington State researchers have demonstrated the importance of providing adequate space to achieve maximum growth. They compared the following two pen densities:

Pig Weights		Adequate	Crowded
kg	lbs	m^2 ft^2 per pig	m^2 ft^2 per pig
18 to 45	(40 to 100)	0.46 (5.0)	0.27 (2.9)
45 to 68	(100 to 150)	0.66 (7.1)	0.41 (4.4)
68 to market	(150 to market)	0.85 (9.1)	0.61 (6.6)

Conclusions were:

1. Space restriction depressed average daily gain by 11 per cent (0.70 versus 0.63 kg/1.54 versus 1.39 lbs)
2. Average daily feed intake was decreased (2.3 versus 2.2 kg/5.1 versus 4.8 lbs) by crowding the pigs.

Source: Proceedings American Society of Animal Science 73rd Annual Meeting 1981 American Society of Animal Science.

Temperature Grower-finisher pigs require a warm, dry, draft-free environment that is adequately ventilated and maintained at a relatively constant temperature. Recommended temperatures are:

Weight	°C (Celsius)	°F (Fahrenheit)
7 to 14 kg (15 to 30 lbs)	24 to 27	75 to 80
14 to 25 kg (30 to 55 lbs)	21 to 24	70 to 75
25 to 45 kg (55 to 100 lbs)	18 to 21	65 to 70
45 to 100 kg (100 to 220 lbs)	16 to 18	60 to 65

Feeding methods There are three basic feeding systems for growing-finishing pigs:

1. *Floor feeding* This method is done mechanically with automatic drop feeders or manually with a cart and scoop. To be efficient, floor feeding requires limiting the feed available. By feeding more, the pigs cannot consume all the feed at one time without some waste. The remaining feed is laid or slept on and becomes unpalatable. For best results, do not feed pigs any more at one feeding than they can eat in 20 minutes. Dust and waste tend to be high with most floor-feeding systems
2. *Self-feeding* This allows pigs continuous access to feed. If the feeder design is good and it is properly adjusted, dust and waste is less than in floor feeding. Complete mechanization to distribute feed to all the self-feeders is possible with overhead augers and drop tubes.
3. *Liquid feeding* Meal is mixed with water at 2.5 to 4 parts water to one part meal. The slurry is pumped to feeding troughs in each pen. Initial cost is higher. Also the troughs take more space, reducing the barn's carrying capacity. The advantage is less dust and waste. Liquid feeding systems are not common.

Feed preparation Rolling or grinding grain to the same degree of fineness provides similar value

for hogs. Feed for swine is best ground or rolled to a medium fineness. All the kernels should be broken but not as fine as flour.

Swine rations may be ground and the ingredients mixed on the farm using a grinder-mixer or stationary hammermill with a proportioner. Alternatively, buy prepared feed from a commercial feed dealer.

Feeding grower-finisher pigs Pigs weighing 25 to 60 kg (55 to 132 lbs) require a 16 per cent crude protein diet. A diet of 14 per cent is adequate for heavier pigs, 60 kg (132 lbs) to market weight. Introduce all ration changes gradually. If this is not possible, reduce the feeding level of the new diet until the pigs become accustomed to it.

Health Thoroughly clean and disinfect pens before they are occupied by new pigs. Use a high pressure 3500 to 4100 kPa (500 to 600 psi) sprayer for washing the pens. If possible, allow the pen to dry before it is occupied again.

The death loss of growing-finishing pigs is generally less than two per cent when good management is practiced. Pig scours, pneumonia, atrophic rhinitis, roundworms and mange are common diseases and parasites that reduce growth performance. Post-weaning scours is often a problem caused by stress and adjusting from milk to solid food.

Record keeping The three main feedlot traits affecting grower-finisher profits are growth rate, feed efficiency and carcass grade. A good operator will continually monitor and evaluate these traits and will make changes whenever necessary to maintain high levels. This information can be obtained by:

- Ear notching some litters and recording the birth date and sow. When marketing, weigh the pigs and record litter numbers.
- Calculating the days from birth to market.
- Weighing a pen of pigs every week and determining the average daily gain. By keeping track of feed used weekly or monthly and pigs on feed, an estimate of feed efficiency is obtained. Weighing the feed into a pen of pigs and recording the weight gain, gives a more accurate estimate of feed conversion. (It pays to know what is going on in the feeder barn!)
- Evaluating grading reports on a monthly and annual basis.

Marketing Market hogs are sold on a carcass weight basis. Hogs will dress about 78 per cent. A live hog weighing 100 kg (220 lbs) will dress about 78 kg (172 lbs).

Under the present grading system, hogs that dress at 68 to 86 kg (150 to 189 lbs) have the best chance of scoring a high carcass index. A scale is the best method of assessing the weight of live hogs.

General transport practises Rough handling and transporting of market hogs cause in-transit death or carcass damage which costs the swine industry millions of dollars annually. To reduce losses follow these guidelines:

Pre-loading

- Feed lightly or withhold feed for one feeding period prior to slaughter. Full feeding causes slippery, dirty truck floors which increase the possibility of injury.
- Provide loading facilities that are free of sharp objects, have moderate slopes and have solid sides to prevent animals from observing distractions outside the loading chute.
- Remove hazardous objects from the alleyways and loading area. Do not leave forks, feeding equipment, boards or protruding nails where a pig can injure itself.
- Provide firm footing on loading ramps and truck floors. Use a step ramp to make the loading of animals safer and easier. Shavings, sawdust or sand are ideal bedding materials.

Loading and unloading

- Keep pigs quiet and do not excite them unnecessarily during loading.
- Use a flat, wide canvas slapper or plywood board (with holes for hands). Use an electric prod sparingly and do not use frozen slappers (winter time), forks, pipes, sticks or canes. Use only the flatside of plastic slappers as striking with the edge causes bruises.
- Do not overcrowd hogs either in the alleyways or on the truck. Allow 0.32 m^2 (3.5 ft^2) of truck floor space per hog. Injuries increase when hogs have insufficient space.

Transport practices

- Be sure the truck is backed up squarely to the loading or unloading facility.
- Drive away from the loading area in a slow, steady manner. Avoid fast curves or sudden stops.
- Provide partitions in the truck when hauling large numbers to avoid piling of the animals in case of a sudden stop.

- Always cover (tarp or solid cover) the truck so pigs are protected from sun in summer and cold in winter.
- Once loaded, take hogs to market as soon as possible. For long distances, always check the load after being on the road for an hour (critical period for animals adjusting to transport).
- Let the animals unload by themselves, (if possible). Rushing them or using brute strength results in frequent pile-ups and the doubling of hogs through the truck gate. Bruising and more serious injuries can result.

Hot weather transport

When shipping hogs in hot weather, consider these additional recommendations:

- Where possible, select market-weight pigs the night before and cut them into an empty pen.
- Keep hogs on full water.
- Reduce load size by ten per cent.
- Move hogs in the early morning to avoid the heat.
- Provide proper ventilation.

Cold weather transport

For cold weather conditions, follow these guidelines:

- Cover holes which allow freezing drafts. A cold bast of air at 90 km per hour (55 mph) can cause frostbite within one minute.
- Observe weather conditions carefully and adjust ventilation if required. A completely closed truck box can cause suffocation.
- Line metal boxes and floors with wood to prevent frostbite from contact with the cold metal.

Pre-slaughter treatment

The treatment pigs receive from the time they leave the farm until arrival on a slaughterhouse floor has a marked effect on carcass yield and meat quality. Management during this brief pre-slaughter period is a concern to the producer, processor and consumer of pork. Recent Australian research indicates that three practices make up the major causes of meat quality deterioration:

1. Unloading and reloading hogs during the journey from farm to slaughter plant. The stress of being disturbed, rather than the total distance transported, was the main problem. Marketing systems must allow pigs to be trucked directly from farm to slaughterhouse.
2. Long period of rest
3. Lengthy transport during the heat of the day

These practices produced fatigue and distress in the pigs. Such stress prior to slaughter was expressed in the pig carcasses in several ways. Meat was dark, firm and dry in some cases; such product had a poor keeping quality and tended to become discolored during curing. On other occasions, meat from mis-handled animals was pale, soft and watery, giving it an unattractive appearance and making it subject to large weight losses during storage and processing. This condition is known as PSE and may be related to Porcine Stress Syndrome (PSS).

Efficiency of production The goal of the growing-finishing period is to produce lean pigs, under a full-feeding system, with the least amount of feed. Its achievement depends on these factors:

- Havings pigs with genetic potential to produce lean carcasses.
- Properly balanced diets to achieve that genetic potential.
- Suitable environmental conditions.

Gorwth rate, feed efficiency and carcass quality are medium to highly heritable traits. By selecting breeding stock that are superior in these traits, considerable progress will be made toward the production of lean, fast-growing, efficient pigs.

Ration formulation and feeding are also important. Feed alone, represents a large part of the cost of growing a pig out to market (60 to 70 per cent). For maximum growth, the pig must consume a diet containing adequate levels of all nutrients. The growing pig needs a high energy, low fiber diet that contains adequate levels of protein, calcium, phosphorus, trace minerals and vitamins. (Ration formulation is covered in Lesson 3).

Full-feeding promotes rapid growth. Pigs reach market weight faster and a higher barn throughput can be achieved. Self-feeding (using self-feeders) requires less labor and a small extra investment.

At times, restricted feeding may be necessary. For example:

- During the first week after weaning to prevent post-weaning scours.
- If ration changes cannot be made gradually, reduce the feeding level of the new diet until the pigs become accustomed to it.

- With poor quality pigs, it is often necessary to restrict feed intake and growth rate to produce leaner carcasses. Improvement depends on the type of pig and the level of restriction. If pigs are capable of producing lean carcasses on full feed then feed restriction will not improve grades but it will reduce growth rate. If feed restriction is practiced, do not restrict the level to less than 85 per cent of full feeding and not before the pigs have reached 60 kg (132 lbs).

Restricted feeding during the finishing period increases the time to market. In turn labor and housing costs are increased and throughput is reduced. Improvement in carcass grades must offset these higher costs in order to warrant restricted feeding.

Feed efficiency is measured by the amount of feed required to produce a unit of body weight gain. Besides genetics, the type of ration and feeding level, environment, disease and feeder design affect how efficiently feed is used by the pig. Pigs in environments with varying temperature, drafts, excess humidity or high odor level will not grow as fast as they would under properly controlled conditions. Pigs with chronic pneumonia, atrophic rhinitis or a heavy parasite load will grow slower, reducing feed efficiency.

The biggest factor in producing poor feed conversion is feed waste due to poor feeder design. Too often feed is dug out of a self-feeder onto the floor. It becomes bedding, is mixed with manure, or falls into the pit. Install strong tight self-feeders with dividers or small sized holes so that the feed cannot be rooted out. Adjust the controls to prevent excessive flow of the feed into the feeder holes.

With self-feeders, provide about 80mm (3 in) of feeder length per pig to keep waste to a minimum. When floor feeding, feed only enough for the pigs to clean up in 20 minutes.

Management of newly purchased feeder pigs

Newly purchased feeder pigs have been loaded and moved at least once, and possibly more if purchased through an auction market. They are subjected to considerable stress, including fatigue, hunger, thirst, temperature changes, ration changes, a new environment and new penmates. This can result in disease, a period of poor performance or death loss. The management goal is to reduce these stresses and assist the newly purchased pigs in recovering as quickly as possible.

Note: The following recommendations apply when purchasing weaned pigs from any source, but particularly when purchasing at auction marts or other agencies that group weaner pigs with different origins.

Source of weaners Buy pigs that have been weaned at least two weeks. They are better adjusted to dry feed and a common water source. The best method is to purchase known, healthy weaner pigs from a single source.

Transport Weaner pigs are less capable of withstanding stress than market hogs during transport. Allow 0.18 m^2 (2 ft^2) of floor space per pig when trucking and closely follow the procedures previously outlined for market hogs.

Farm arrival Have a place ready for new arrivals. Provide clean, dry, disinfected pens in a well-ventilated, draft-free, and warm place. Allow 0.37 m^2 (4 ft^2) of floor space for 14 to 25 kg (30 to 55 lbs) pigs and 0.46 m^2 (5 ft^2) for heavier pigs to 30 kg (80 lbs) and maintain temperature at about 24°C (75°F). Weaner pigs perform better if they are sorted by size and penned in groups of about 20 pigs.

Waterer space Adequate supplies of clean, fresh water at all times is a must. For automatic devices, allow one waterer for each 20 pigs. Be sure the pigs know how to operate any mechanical device. If nipple waterers are used, using a leaky waterer at first will help them to learn.

Water medication Begin medicating the water 12 to 24 hours after arrival of the pigs and continue treatment for about one week. A product containing both antibiotics and electrolytes is recommended. Supply the medication by using a tank or barrel, or any other means in which actual water consumption can be measured. A weaner pig normally consumes about twice as much water as feed. This is about two Litres (0.50 gal) per day for an 18 kg (40 lb) pig. If medicated water consumption is less, the pigs are not receiving the required medication level. Consider switching to a more palatable product or adding a flavor enhancer like jello.

Feeder space Provide at least one uncovered feeder space (self-feeder) for every four pigs or 200 mm (8 in) of open trough space per pig to reduce fighting over feed. For covered feeders, tie lids open for several days or until pigs are conditioned to raising lids.

Nutrition Medicated starter diets containing 18 per cent crude protein, antibiotics and other medicines are helpful in getting pigs off to a good start. Restrict feed intake for the first four to five days by adjusting feeders or hand feeding twice daily. Then full-feed for the duration of the three week isolation or starting period. After pigs have been

transferred to the grower area, feed a 16 per cent protein diet which is not medicated.

Use feed additives carefully. Consult your veterinarian or a person knowledgeable in nutrition when selecting antibiotics and other additives. Use the highest federally-approved preventive level for the additive selected. If higher levels of medication are required to treat sick animals or for a disease outbreak, a veterinarian's perscription is necessary. Current feed additive levels, usage and restrictions are given in Manitoba Agriculture factsheet *Feed Additives For Swine*, Agdex 440-67. The choice of feed additive depends on your veterinarian's advice, previous farm history of disease and additive availability.

Internal parasites Deworm the pigs 7 to 10 days after arrival. If pigs are ill or highly stressed, delay deworming until after recovery. Dewormers are usually given in either the feed or the water. Use a broad spectrum product.

External parasites Spray for external parasites (lice and mange) as soon after arrival as possible and as often as necessary.

Disease control Provide a separate hospital pen for sick pigs (those that are weak, unthrifty, not eating, coughing, scouring or have difficulty breathing). Individually treat on the advice of a veterinarian for at least three consecutive days.

Isolate newly purchased pigs for up to three weeks in a separate, self-contained area of the growing-finishing barn. Preferably place these pigs in a separate barn before introducing them to the regular grower-finisher area. Upon arrival, check pigs carefully and treat any sick pigs immediately. Continue to observe closely two or three times daily for the next week, when most losses are apt to occur.

Look for signs of illness, and abnormal social habits such as tail-biting, canniablism or ear chewing. Also, monitor feed and water consumption.

If unusual problems or losses occur, contact your veterinarian immediately. A good practice is to routinely submit sick or dead animals to Manitoba Agriculture's Veterinary Diagnostic Laboratory in Winnipeg, to confirm diagnosis of the problem and the method of treatment. Early treatment is the cheapest and most effective way to prevent death losses. If pigs have not been vaccinated prior to purchase, vaccinate them for erysipelas in two to four weeks.

Records Identify by ear tag a representative sample (five per cent) of each group of weaner pigs purchased. This will serve as a reference for identifying the herd (source) of origin in cases of death losses or severe problems. Pig identification and a complete set of production records are necessary for identifying the suppliers of your top-performing feeder pigs.

Summary

Management principles are critical to achieving maximum returns in a farrow-to-finish swine operation. These techniques are important in all phases of the production cycle, from selection of breeding stock, management of herd sires and replacement gilts, to breeding and gestation practices, management of the sow and litter during farrowing and lactation, and to management of the pig during the growing-finishing stage.

There are several important areas of management that must be implemented:

Nutrition Feed a balanced ration at all stages to all pigs. Be sure to feed correct amounts.

Environment Provide clean, dry, draft-free and well-ventilated living quarters. Maintain proper temperatures.

Herd health Only buy pigs from herds with a known health status. Watch for signs of disease or parasite problems. Treat quickly with recommended products and consult a veterinarian regularly.

Herd records Maintain records of all activities of the breeding herd. Monitor growth rates, feed used and carcass quality.

Other related publications:

Manitoba Agriculture factsheets:

— Care and Management of Newly Purchased Boars, Agdex 440-21.

— Managing Newly Purchased Feeder Pigs, Agdex 445-25.

— Swine Management Checklist, Agdex 440-10.